

Cut Nets

by Year 6 at The Gerrards Cross C of E School

To get started with the investigation, our class discussed potential approaches to the problem and different ways of working. Some suggested cutting out the parts of the nets and then fiddling around with the pieces of paper to try to match two halves together to create a whole one that would fold to form a 3D shape.

Others considered the relationship between the faces on the 3D shapes listed and the associated shapes that would be present on a corresponding 2D net.

Groups of three or four in the class were allocated a 3D shape and worked together to find the two parts for that shape. They then wrote an explanation to show their thought processes and reasoning. Here is what each group found out.

By E, A and L

Cube

Because a cube has six square faces, the first nets we looked at were E and K. Both of the nets had three squares, which means when it's folded together it would make six square faces.

Answer : E and K

By S, S and L

Cuboid

We figured that if you are making a cuboid net you need four rectangles and two squares which make the six faces. We figured if we started with C we had four faces in total and needed two more 2 rectangles the same size as two of the ones on C. G looked too wide, but P fitted about right and that completed our cuboid net.

Answer : C and P

By M, E, C and D

Tetrahedron

We found out that to make a tetrahedron you would need 4 triangles exactly the same size and shape and length. There were three possibilities, but F looked too big and the odd one out of the three. Therefore we decided to try with the only other two pairs of triangles which were L and M.

Answer : L and M

By B, C and N

Square pyramid

We were able to make a square pyramid by looking for a part that contained a square and at least one triangle. B fitted that description so we then looked for the remaining two triangles and identified F, L and M. L and M appeared to be smaller triangles than the corresponding ones that were already in B, so we looked at F instead which seemed a better match. After that we cut out the two nets and put them together successfully to form a square pyramid.

Answer : B and F

By P, A and R

Pentagonal Pyramid

We first realised that we needed a pentagon as a base so looked for something with 5 sides. A pyramid needs triangles which ruled out R, but left us with D. Because a pentagon has 5 sides we needed three more triangles and N allowed us to complete the pentagonal pyramid.

Answer : D and N

By J, F and W

Hexagonal Pyramid

We noticed that the first part of the hexagonal pyramid was a hexagon with two triangles attached onto it. We then worked out that we needed another four triangles and found O. The answer is O and S.

Answer : O and S

By F, L and J

Triangular prism

We looked at Q and saw there were two triangles and a rectangle. It occurred to us that it looked like a part of a net of a triangular prism and then we realised that there had to be the same number of rectangles as the number of sides on the original 2D shape. (eg. the triangle in this case.) Therefore, there must be three rectangles for a triangular prism because a triangle has three sides. Q only has one triangle and G has two rectangles and 1 added to 2 equals 3. We noticed that P also has two rectangles but they were not wide enough. Consequently, G and Q join together to make a triangular prism.

Answer : G and Q

By A, A and J

Pentagonal Prism

Firstly, we examined the shapes and tried to observe the relationships in the between the nets. Then we identified that both J and R had pentagons and rectangles in their nets (we ruled out D as it had triangles attached). Then we cut out J and R to test them and discovered they made a perfect pentagonal prism.

Answer : J and R

By N, S and L

Trapezoid Prism

When we first looked for possible matches, we couldn't relate two parts together, but we then realised that the shape at the top of A (trapezium) was an upside down version of the shape on the end of H. We then tried several different ways of folding the shape to form the trapezoid prism. A trapezium has four sides so we knew we were also looking for four corresponding rectangles to form the faces on the 3D shape. Finally H, was placed beside A to create a trapezoid prism.

Answer : A and H

By C, S, T and H

Finally, we tabulated our results as a class into the table below:

Shape	Nets
Cube	E and K
Cuboid	C and P
Tetrahedron	L and M
Square pyramid	B and F
Pentagonal pyramid	D and N
Hexagonal pyramid	O and S
Triangular Prism	G and Q
Pentagonal Prism	J and R
Trapezoid Prism	A and H